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which was in $\alpha = 131°$, $\delta = +55°$. After about a minute, this streak assumed a beautiful wavy appearance ∿∿∿, and two or three minutes after one of the shape of an S, the axis of which was inclined to the original axis about 70°. Five minutes after its first appearance it had drifted over the star ο *Ursæ*, and was still pretty bright when it was obscured by clouds.

The third was very bright, of a greenish hue, and exploded like the first, but behind thin cloud, which did not prevent its illuminating all around. Unfortunately, its position could not afterwards be identified.

On the 14th, from $14^h\,30^m$ to $15^h\,20^m$, about a third of the sky being very clear, five small shooting stars only were seen, radiating from *Orion*.

The thickness of the dense part of the stream must have been about 52,000 miles, measured perpendicularly to the plane of the orbit. It may only have been one aggregation among many, and may not have been situated centrally in the stream.

From these observations the elements of the orbit are

$$\pi = 62°\,36'$$
$$\mathrm{I} = 15\;\;38$$
$$\Omega = 231\;\;44$$
$$\epsilon = \cdot 9062$$

Motion retrograde.

Assuming a periodic time of $33\frac{1}{4}$ years.

Port Saïd, Lower Egypt,
16 *November*, 1869.

The Assistant-Secretary, Mr. Williams, read some extracts from the introductory remarks to the MS. work presented to the Society by him at the last meeting, being a translation of the accounts of comets observed in China from B.C. 613 to A.D. 1640, with the original text, of which introductory remarks the following is a brief abstract:—

According to Chinese tradition the Emperor Shin Nung, the successor of Fuh He, the founder of the empire, was the first who instituted astronomical observations. His reign commenced B.C. 3218. One of his successors, Hwang Te, is reputed to have been the monarch who established the mode of reckoning their chronology by cycles of 60 years, in use to the present day. The first of these cycles commenced B.C. 2637. He is also said to have discovered the lunar cycle of 19 years, by which the intercalary moons were to be regulated, from which it should appear that this cycle was known to the Chinese about 2000 years before it was introduced into Greek astronomy by Meton. These, however, must be looked upon merely as Chinese traditions, having no other authority.

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In the most ancient of the Chinese historical works, the Shoo King, the instructions of the Emperor Yaou, who ascended the throne B.C. 2356, to his astronomers He and Ho are mentioned. In these they are, first, commanded to record their observations of the heavenly bodies, to complete the calendar, to make an instrument to show the motions of the Sun, Moon, and stars, and with due respect to impart information respecting the seasons to the people. In the succeeding four paragraphs four astronomers are sent to places in the east, south, west, and north, to observe the equinoxes and solstices, and certain stars are named as indicating the seasons. The first of these stars answers to our *α Hydræ*, which is described as culminating at sunset on the day of the vernal equinox. From this it seems that the vernal equinoctial point was then in the *Pleiades*, and consequently by the precession of the equinoxes it would appear that this observation was made B.C. 2306, being the 56th year of the reign of Yaou, thus affording a strong presumptive proof of the veracity of Chinese history as recorded in the Shoo King. The remaining three paragraphs relate to the labours of the other three observers; and, in conclusion, Yaou calls the attention of the astronomers to the fact that the year consists of 366 days, and among other matters of less importance to astronomy directs them to fix the intercalary moons, by which the seasons were to be kept in their places. Many other works are mentioned, both ancient and modern, as containing astronomical notices, and among these the great historical work called the *She Ke* and the Encyclopædia of Ma Twan Lin, are more particularly noticed as being those from which the greater number of the observations of comets contained in this volume have been extracted. The number of these observations thus brought together amounts to 370, a few of these may be meteors, but the far greater number are undoubtedly comets. Those mentioned by E. Biot in his communication to the *Connaissance des Temps* for 1846, amount to 224, consequently, in the present catalogue there are about 146 more than are given in that work; and there is reason to believe that the list now under consideration is as complete as any that has hitherto appeared.

The observations taken singly may be considered as divided into two parts, the one chronological, and the other astronomical. For reducing the first to our reckoning, certain tables have been constructed consisting of a complete set of chronological tables to be used in finding the years, and of others needed in reducing the moons and days. The construction and use of these tables are fully explained, and illustrated by examples of their application, and by their aid any year, moon, or day mentioned in the Chinese records can readily be reduced to our time.

For the astronomical portion, a complete celestial atlas, traced from the cuts in a Chinese work on astronomy, has been made, and which, as well as the preceding tables, forms a part of the work. In this the twenty-eight stellar divisions and the three

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great spaces in which the stars are distributed by the Chinese are figured and described. To this atlas there is a full explanation, so that any group of stars mentioned in Chinese astronomy may be readily found by means of the index to the names; and the accordance of these groups with our constellations, is also made clear by means of reduced copies of the figures in Flamsteed's Atlas, with the Chinese asterisms laid down on the corresponding stars. There are many other interesting particulars mentioned in these introductory remarks which time did not allow to be entered upon, particularly an enumeration of the subjects treated of in the sections and chapters of the astronomical division of the history of the Ming dynasty 1368-1644, which, among other matters of interest, contain not only cometary observations, but also a catalogue of stars, with their longitudes and latitudes, both on the equator and the ecliptic, and more than seventy pages of observations of occultations of stars by the Moon and the planets.

Mr. Williams concluded by expressing his conviction that in placing this volume in the library of the Society he had secured it a position in which it is the most likely to be of service in future investigations into the subject of Chinese astronomy.

On Auroral Appearances and their Connexion with the Phenomena of Terrestrial Magnetism. By Balfour Stewart, F.R.A.S.

Some years since I ventured to suggest that auroral displays might be secondary currents due to small but rapid changes, caused by some unknown influence in the magnetism of the Earth. In developing this idea, the Earth was compared to the core of a Ruhmkorff machine, and the moist upper strata of the Earth, as well as the upper strata of the atmosphere, to secondary conductors, in which currents will take place whenever the magnetism of the Earth changes from any cause. These views would appear to be confirmed by the very interesting records of earth-currents obtained by Mr. Airy at the Greenwich Observatory, in which it is found that during times of great magnetic disturbance there are strong earth-currents alternating from positive to negative, the curves lying nearly equally on both sides of the zero.

A further development of this idea has lately occurred to me, in consequence of a remark of my friend Mr. Lockyer, that the zodiacal light may possibly be a terrestrial phenomenon, and may therefore be somehow connected with the phenomena of terrestrial magnetism. For not only will secondary currents be caused in a stationary conductor in presence of a magnetic core of variable power, but also in a conductor moving across the lines of force of a constant magnet. The question arises, have we on the Earth such moving conductors? In answer to this, let us reflect what takes place at the equator. When once the anti-trades have reached the upper regions of the atmosphere,